



# ECONOMICS COMMENTATOR

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## HAY SUPPLY AND DEMAND BALANCE SHEET

by

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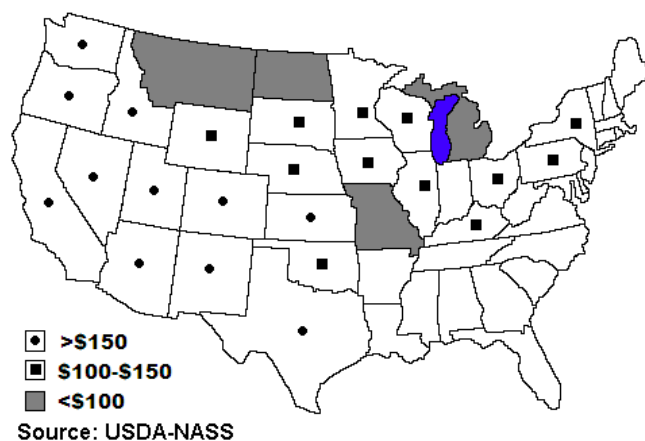
As with most markets, price and product distribution are affected by many things. The supply, demand, and price of hay are no different. U.S. hay prices continue to set all time record high levels. One factor behind the high prices is the southern drought many farmers and ranchers are facing. Extreme drought is affecting their supply of hay and causing them to consider buying more hay than normal. Another factor affecting the aggregate domestic demand for hay is the trend of fewer livestock numbers. In addition to these important domestic factors, the hay market is increasingly affected by international trade.

In this *Commentator*, we examine the recent U.S. hay situation. We measure and incorporate imports and exports into the balance sheet to give a more accurate view of the U.S. hay situation. We also look at domestic feed disappearance to provide a clearer picture of trends in feed use. Ignoring trade or domestic demand would give a much different estimate of ending stocks and prices.

Hay statistics are taken from National Agricultural Statistics Service (NASS) reports. The national price for all hay in the U.S. reached a nominal all-time high level in August of \$172 per ton. The prices at many state levels continue to set records as well. Many states do not have a price reported monthly

(figure 1). However, most of the areas with marketable hay supplies have prices. The lowest prices in August were in the northern plains. North Dakota and Montana have had ample moisture the past two years resulting in large production levels and low prices. The rest of the north central states mainly have prices from \$100-150 per ton. Drought conditions have pushed the prices higher in the southern plains. The state with the highest price is New Mexico at \$253 per ton. The prices are also relatively high throughout the western states. Spot market prices for exports continue to remain competitive.

**Figure 1. August All-Hay Prices (\$/ton)**



Historic and current balance sheet numbers are available from Economic Research Service (ERS) reports. The typical balance sheet begins with May 1 stocks and adds production to obtain total U.S. supply (table 1). Then one subtracts disappearance from the total supply leaving ending stocks (May 1 of the latter year).

Within the standard hay balance sheet, usage and exports are included into the broad category labeled disappearance. Imports are not accounted for in the

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total supply. Therefore, the impact of imports and exports on the balance sheet is unknown.

**Table 1. All Hay Balance Sheet (million tons)**

| Marketing Year     | 2008/09 | 2009/10 | 2010/11 |
|--------------------|---------|---------|---------|
| Beginning Stocks   | 21.6    | 22.1    | 20.9    |
| Production         | 146.3   | 147.7   | 145.6   |
| Supply             | 167.9   | 169.8   | 166.5   |
| Less Disappearance | 145.8   | 148.9   | 144.3   |
| Ending Stocks      | 22.1    | 20.9    | 22.2    |

Source: USDA-ERS

### Hay Trade

Typically the U.S. is thought of as a hay exporter, without a big market share on the importing side. According to the Livestock Marketing Information Center (LMIC), in a March 2011 newsletter, hay exports have been increasing over time. In 2010, hay exports were 2.6% of annual production, which is an increase from 1.2% in 1994. As U.S. hay exports continue to increase, the impact on domestic disappearance remains unknown. The LMIC also generates a complete balance sheet and balance sheets for alfalfa and for other hay.

Although the numbers are small, the U.S. has started to increase its volume of imported hay, specifically from Canada. According to Tyrchniewicz (2010), the U.S. mainly imports other hay and timothy hay. In the U.S., timothy hay falls into the category of other hay. Trade data were obtained from the United States International Trade Commission (USITC). When alfalfa products are included in imports, the percentage of alfalfa hay equivalents grows and is comparable to other hay imports.

Export values are broken down into other hay, alfalfa hay, and alfalfa hay products. Alfalfa hay products are broken down even further into alfalfa cubes dehydrated and sun cured, alfalfa meal dehydrated and sun cured, and alfalfa meal miscellaneous. The alfalfa hay product total is reported in metric tons, presumably at standard moisture levels. We added them together to get a general total.

After dehydration or drying, there are moisture differences between alfalfa hay and alfalfa hay products. To account for this, we used the Feedstuffs

2011 Reference Issue and Buyers Guide to obtain standard moisture levels. The dry matter content of alfalfa products is 93%. According to Mid American Auction Inc. reports, the average moisture content of alfalfa hay is 15%. Because hay products have less moisture than baled hay, each ton of hay products was adjusted up to a baled hay equivalent by multiplying by 1.094.

After converting for moisture differences, we were left with other hay exports, alfalfa hay exports, other hay imports and alfalfa hay imports. Both imports and exports are calculated in metric tons (2,204.62 lbs). We took these numbers and converted them into U.S. short tons (2,000 lbs). All traded quantities were converted by multiplying by 1.102. Thus, after final calculations alfalfa hay products were increased by over 20% from their original reported quantities.

The original balance sheet entries are reported on a marketing year basis, May 1 through April 30. We prorated the yearly traded quantities into two sections. We assumed the first four months of each calendar year are related to the earlier marketing year, and the last eight months are related to the latter marketing year. We calculated the first four months and the last eight months, and appropriately distributed them as such. The trade data are reported monthly so for 2011 we used the monthly total from January through April.

After all conversions and calculations were made, we then started factoring the imports and exports into the balance sheets. We first kept alfalfa and other hay separate, and then totaled them in a final balance sheet. Production and ending stocks remained the same. Imports were added to supply, which increased it. Exports were subtracted from supply, and the residual amount was relabeled domestic use.

The alfalfa balance sheet is affected by trade (table 2). The exports dominate and as a result the domestic use figure is smaller than the original disappearance figure. Imports have declined in the past three years, but prices have fallen domestically too. Domestic use is the one aspect that changed in 2010/11, falling substantially from a year earlier.

The other hay balance sheet was affected similarly (table 3). Imports have been larger relative to alfalfa while exports have been mixed.

**Table 2. Alfalfa Hay with Trade (million tons)**

| Marketing Year       | 2008/09      | 2009/10      | 2010/11      |
|----------------------|--------------|--------------|--------------|
| Beginning Stocks     | 10.30        | 10.60        | 10.10        |
| Production           | 70.20        | 71.10        | 67.90        |
| Imports              | 0.09         | 0.06         | 0.05         |
| Supply               | 80.59        | 81.76        | 78.05        |
| Less Exports         | 1.50         | 1.93         | 1.92         |
| Less Domestic Use    | 68.49        | 69.72        | 65.73        |
| Ending Stocks        | 10.60        | 10.10        | 10.40        |
| <i>Disappearance</i> | <i>69.90</i> | <i>71.60</i> | <i>67.60</i> |

Sources: Original entries are from LMIC. Trade data are from USITC.

**Table 3. Other Hay with Trade (million tons)**

| Marketing Year       | 2008/09     | 2009/10     | 2010/11     |
|----------------------|-------------|-------------|-------------|
| Beginning Stocks     | 11.30       | 11.50       | 10.80       |
| Production           | 76.10       | 76.60       | 77.70       |
| Imports              | 0.10        | 0.08        | 0.06        |
| Supply               | 87.50       | 88.18       | 88.56       |
| Less Exports         | 1.77        | 1.86        | 1.97        |
| Less Domestic Use    | 74.24       | 75.52       | 74.69       |
| Ending Stocks        | 11.50       | 10.80       | 11.90       |
| <i>Disappearance</i> | <i>75.9</i> | <i>77.3</i> | <i>76.6</i> |

Sources: Original entries are from LMIC. Trade data are from USITC.

**Table 4. All Hay Balance Sheet with Trade (million tons)**

| Marketing Year       | 2006/07       | 2007/08       | 2008/09       | 2009/10       | 2010/11       | 2011/12       |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Beginning Stocks     | 21.30         | 15.00         | 21.60         | 22.10         | 20.90         | 22.20         |
| Production           | 140.80        | 146.90        | 146.30        | 147.70        | 145.60        | 128.90        |
| Imports              | 0.15          | 0.20          | 0.19          | 0.13          | 0.11          | 0.11          |
| Supply               | 162.25        | 162.10        | 168.09        | 169.93        | 166.61        | 151.21        |
| Less Exports         | 2.67          | 2.79          | 3.26          | 3.79          | 3.89          | 3.89          |
| Less Domestic Use    | 144.58        | 137.71        | 142.73        | 145.24        | 140.52        | 131.82        |
| Ending Stock         | 15.00         | 21.60         | 22.10         | 20.90         | 22.20         | 15.50         |
| RCAU (millions)      | 71.8          | 71.5          | 70.9          | 70.2          | 69.5          | 68.3          |
| <i>Disappearance</i> | <i>147.10</i> | <i>140.30</i> | <i>145.80</i> | <i>148.90</i> | <i>144.30</i> | <i>133.87</i> |
| Disappearance/RCAU   | 2.05          | 1.96          | 2.06          | 2.12          | 2.08          | 1.96          |
| Domestic Use/RCAU    | 2.01          | 1.93          | 2.01          | 2.07          | 2.02          | 1.93          |

Sources: Original entries are from USDA-ERS and LMIC. Trade data are from USITC.

## Hay Balance Sheet

The combined totals reflect a similar pattern from the impact of trade (table 4). Recent trends give some indications of the impacts likely for 2011/12. Beginning stocks were relatively tight in the beginning of 2007/08 at 15.0 million tons. At the start of 2011/12 the stocks were higher at 22.2 million tons. Production is very small in 2011/12, currently projected at 128.9 million tons, as fewer acres were harvested and yields were down sharply in the southern plains. Anecdotal reports suggest hay trade is continuing at the same pace as a year ago. Thus, supply is likely to be 151.21 million tons, very low compared to recent years. If exports remain similar to last year, then the remaining unknown is domestic use.

Domestic demand is largely driven by livestock consumption. In the U.S. there has been a steady decline in livestock inventories. One common measure of feed demand is from roughage consuming animal units (RCAU), which weights different types of livestock by the amount of non-grain feed consumed. RCAU is computed and reported by ERS, but only forecasted by LMIC (table 4). As inventories have declined, so has RCAU.

We calculated changes in hay disappearance per RCAU. We calculated the difference in the original supply and disappearance per RCAU, and the supply and disappearance per RCAU after imports and exports. As expected, domestic use per RCAU is less than the originally calculated disappearance per RCAU because of trade.

The 2011/12 disappearance and domestic use totals are computed by multiplying the low levels per RCAU observed in 2007/08 by the forecasted RCAU level of 68.3 million units. Note that ignoring RCAU adjustments would likely imply using the disappearance figure from 2007/08 of 140.50 million tons. That would leave ending stocks at 10.60 million tons. Ignoring trade would suggest using the projected disappearance figure of 133.87 million tons for 2011/12, leaving ending stocks of 17.23 million tons. Bringing in the effects of trade and using a conservative domestic use estimate of 131.82 million tons leaves a tight, but reasonable level of 15.50 million tons.

Without adjusting for trade, disappearance per RCAU would likely show an increase. As the RCAU level decreases and as exports continue to

increase, the difference between disappearance and domestic use also increases. Therefore, incorporating trade into the balance sheet and calculating the domestic use per RCAU, rather than the disappearance per RCAU, reflects a more accurate account of domestic hay consumption and the likely impacts on U.S. hay prices.

## References

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